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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER

KORNAKOV, MICHAEL

ART UNIT

PAPER NUMBER

1746

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/759,925

Applicant(s)

SATO ET AL.

Examiner

Michael Kornakov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/15/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

2. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 6-13, 17-22 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent No. 6,736,147. Although the conflicting claims are not identical, they are not patentably distinct from each other because both groups of claims recite cleaning a CVD chamber with similar processing steps, utilizing plasma species formed from fluorine containing gas, specifically NF_3 , in remote plasma discharge chamber, wherein plasma species are transferred into CVD chamber through piping, wherein transferring includes opening a valve on the piping, which includes withdrawing a sealing element from a path and closing the valve after removing the adhered deposits.

Specification

4. Applicants are reminded that the continuity data of the instant Application should be updated.

5. The use of the trademarks "Karlez" "Epsilon" has been noted in this application (paragraphs 0037, 0084, 0116). It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner, which might adversely affect their validity as trademarks.

6. The disclosure is objected to because the recited on page 25, paragraph 0113 removal rate "1.5 ? m/min" and the recited on page 29, paragraph 0134 temperature "780?C" are not readily ascertainable. Appropriate clarification/correction is required.

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: claims 10 and 21 recite the step of withdrawing a **sealing element**, which is not found in the instant disclosure.

Drawings

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "22" has been used to designate both detector (paragraph 0085) and an upstream opening of the valve 15 (paragraph 0098); reference character

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"23" has been used to designate both an observation window (paragraph 0082) and a downstream opening of the valve 15 (paragraph 0119).

9. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "32" and "33" have both been used to designate the bolt (paragraph 0098). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 10 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recited in claims 10 and 21 "withdrawing a sealing element" constitutes an indefinite subject matter as per metes and bounds of such are not readily ascertainable. The definition of "sealing element" is not provided in

the instant disclosure. For examination purposes it is assumed that a body of the valve, blocking internal path of the piping, is withdrawn from the internal path, thus opening the said path.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-3,6,12-17 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0697467.

EP'467 teaches a method for cleaning a CVD deposition chamber comprising the steps of : a) delivering a precursor gas, such as NF_3 or CH_4 into a remote chamber that is outside the deposition chamber; b) activating the precursor gas in the remote chamber by applying energy with a power about 500-1500 W to form reactive species; c) flowing the reactive species from the remote chamber into the deposition chamber through a piping; d) removing adhered deposits from the inside surfaces of the deposition chamber, wherein the removal rate is 2 micron/minute and wherein the said deposits include silicon nitride, silicon oxide, tungsten (col.2, lines 37-47; col.5, lines 11-18; col.6, lines 11-15, 26-30,39-43,47-56; col.7, lines 1-3). Therefore, all the limitations of the instant claims are met by EP'467.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. Claims 4, 5, 7, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0697467.

With regard to claims 4,7,19 EP'467 teaches activating the precursor gas in

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remote location utilizing RF power source with the wide range of frequencies and specifically indicates the frequency of 400 kHz (col.6, lines 39-43; col.7, lines 49-52), but remains silent about the value of energy power, utilized during the application of RF frequency.

The teaching of EP'467 also differs from the instant claims 5 and 18 by not specifically indicating the flow rate of NF_3 as being between 0.5 slm and 1.5 slm and by not limiting the applied energy power to the range of between about 2,500 W and 3,000 W, while utilizing microwave activation source.

However, EP'467 indicates that the gas flow rate and the energy power are result effective parameters by stating that "the power levels, flow rates and the other processing parameters that are chosen, are system specific and thus they will need to be optimized for the particular system, in which the process is being run. Making the appropriate adjustments in process conditions to achieve optimum of performance for a particular system is well within the capabilities of a person of ordinary skill in the art" (paragraph, bridging col. 7 and 8). Furthermore, it is well settled that discovery of optimum value of result effective variable in known process is ordinarily within the skill in the art and would have been obvious, consult *In re* Boesch and Slaney 205 USPQ 215 (CCPA 1980).

18. Claims 9-11 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0697467 in view of Rajagopalan et al (U.S. 6,274,058)

The teaching of EP'467 remains silent about a valve, positioned on the piping

and about the steps of operating the valve during the cleaning procedure. However, the on/off valves are conventionally utilized in the art in order to isolate the remote plasma environment from the processing chamber. Such isolation allows to maintain remote plasma while running the processing task in the chamber. Thus, Rajagopalan teaches remote plasma cleaning method for processing chambers, wherein an on/off valve 90 is utilized in order to continue operation of remote plasma generator while not requiring that reactive species be provided to the processing chamber 10. Once the valve 90 is open, the cleaning gas (NF_3) reactive species from remote plasma generator 60 flow through gas supply line into the chamber interior (col.6, lines 35-44). Rajagopalan also provides a cleaning routine, wherein after forming deposits within the processing chamber and removing processed substrates from the chamber a plasma in the remote plasma apparatus is initiated and reactive species flow into the processing chamber through supply line 88 passing the opened valve 90.

Because both EP'467 and Rajagopalan are concerned with processing chamber cleaning, utilizing remote plasma source and Rajagopalan provides benefits of utilizing on/off valve positioned on the piping, connecting remote plasma source with processing chamber, one skilled in the art motivated by Rajagopalan would have found obvious to utilize such valve in order to establish remote cleaning plasma environment while still running CVD processing, thus increasing chamber processing output in the method of EP'467 with the reasonable expectation of success.

Regarding the specific limitation of claims 10 and 21, which is concerned with forming an opening in a path, substantially as wide as internal surfaces of the piping,

the skilled artisan would have found obvious to form such opening utilizing the on/off valve in order to provide fast release of reactive species into the processing chamber of EP'467/ Rajagopalan, thus enhancing and accelerating its cleaning with the reasonable expectation of success.

Regarding the specific limitation of claims 10 and 21, which is concerned with sealing element, it is noticed here that the definition of such element is not provided by the instant disclosure. Besides, such element represents a structural limitation of the valve. It is noted here that the recitation of specific structural limitations of apparatus in process claim for performing processing steps, wherein the structural limitations of apparatus do not present manipulative difference between the claimed process steps and the prior art process, do not serve to limit the claim. See, e.g., *In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. Kornakov

Michael Kornakov
Primary Examiner
Art Unit 1746

09/02/2004